

PROSPECTIVE EVALUATION OF A HOSPITAL EPIDEMIOLOGIST'S ACTIVITIES AT A EUROPEAN TERTIARY-CARE MEDICAL CENTER

Christian Ruef, MD

ABSTRACT

OBJECTIVE: Assessment of the distribution of tasks and consultations provided by the hospital epidemiologist (HE) at University Hospital of Zurich (UHZ).

DESIGN: Prospective collection of data on hospital epidemiology consultations over a 3-year period (1995-1997). Time spent per consultation and activities of infection control practitioners were not recorded.

SETTING: A 1,040-bed tertiary-care university hospital in Zurich, Switzerland.

RESULTS: Between January 1, 1995, and December 31, 1997, the HE received 1,660 requests for consultation. Advice or action was sought in the following areas: epidemiology (27.5% of requests); quality assurance, including antibiotic utilization and technology assessment (24.8%); infection control and practice guide-

lines (22.5%); disinfection and sterilization (11.6%); clinical infectious diseases (13.4%). During 1997, 35% of epidemiology consults were related to methicillin-resistant *Staphylococcus aureus* and 5.8% to tuberculosis. Public or private hospitals not affiliated with UHZ requested 40% of all consults.

CONCLUSIONS: This study shows that HEs are involved in many different activities. Only 27.5% of hospital epidemiology consultations were directly related to issues of epidemiology. Practical knowledge of the methodologies for continuous quality improvement and assessment of various new technologies is important for HEs. The results of this study may be useful in discussions between HEs and administrators about allocation of resources or issues of reimbursement (*Infect Control Hosp Epidemiol* 1999;20:604-606).

The job description of hospital epidemiologists (HEs) is not well defined. Whereas most physicians and other healthcare workers (HCWs) have clear perceptions of the professional activities of (for example) gastroenterologists or endocrinologists, a request to describe the activities of HEs prompts a wide range of answers. In many European countries, the position of hospital hygienist is filled by microbiologists or pharmacists. Due to their background and training, the focus of activities has been on disinfection and cleanliness for many years. Within the last 10 years, several hospital epidemiology positions at academic health centers in Europe have been filled by physicians with a clinical background and with training in infectious diseases and hospital epidemiology.¹ These clinicians apply epidemiological tools and techniques and use a patient-oriented approach to hospital epidemiology. Coinciding with this change of priorities from hygiene to epidemiology, healthcare systems in many European countries are undergoing reconstruction and are evolving toward managed care. In this changing environment, HEs must be prepared to justify continued financial support for their activities by documenting their valued contribution to the well being of the institution.

In preparation for such a situation, I conducted a prospective evaluation of my activities as an HE at a European tertiary-care medical center over the course of 3 years (1995-1997).

METHODS

Setting

The University Hospital of Zurich (UHZ) is a 1,040-bed tertiary-care hospital with a very active organ transplant program. It cares for a substantial proportion of immunosuppressed patients. As a public hospital, it generates its income through reimbursement from health insurance companies and through subsidies from the State of Zurich. The hospital epidemiology unit is part of the Division of Infectious Diseases and Hospital Epidemiology.

Hospital Epidemiology Staffing and Mission

The team of the hospital epidemiology unit includes an HE who is an internist with subspecialty training in infectious diseases (ID) and hospital epidemiology; two infection control practitioners (ICPs) one per 500 beds; a secretary (0.5 full-time equivalent [FTE]); one laboratory technician on the UHZ payroll (0.5 FTE); and an additional

From the Division of Infectious Diseases and Hospital Epidemiology, University Hospital of Zurich, Zurich, Switzerland.

Address reprint requests to Christian Ruef, MD, Division of Infectious Diseases and Hospital Epidemiology, Hospital Epidemiology Unit HAL 14C, University Hospital of Zurich, 8091 Zurich, Switzerland.

This work was presented in part at the Seventh Annual Meeting of the Society for Healthcare Epidemiology of America, April 27-29, 1997, St Louis, Missouri.

97-OA-104. Ruef C. Prospective evaluation of a hospital epidemiologist's activities at a European tertiary-care medical center. Infect Control Hosp Epidemiol 1999;20:604-606.

laboratory technician funded through a research grant. The HE holds clinical responsibilities as attending physician in the outpatient ID clinic and on the ID consult service. He is involved in clinical activities during 3 to 4 months per year. The hospital epidemiology unit is mandated by the State Health Department of the State of Zurich to serve as a reference center for other public hospitals in the state. It provides advice to these hospitals on issues of infection control. The HE is a member of the infection control committee of several hospitals in the State of Zurich.

Study Design

Between January 1, 1995, and December 31, 1997, all on-site and telephone consultations with staff of UHZ and staff working in other institutions outside of UHZ were recorded. Questions by, and discussions with, members of the infection control team were not included in this analysis. The time required to deal with each request was not recorded. Data collection was prospective and continuous with the use of a standardized form. Consultations were grouped into the following categories: epidemiology, including outbreak investigation and applied research; quality assurance, including antibiotic utilization and technology assessment; infection control, including surveillance, education, and practice guidelines; disinfection and sterilization; and clinical IDs. Infectious diseases consultations were recorded only if requested outside of the official periods of duty on the consult service.

RESULTS

Between January 1, 1995, and December 31, 1997, the HE received 1,660 requests for consultations. The number of consultations increased 63% during the study period, from 418 in 1995 to 562 in 1996 to 680 in 1997. The Figure shows the distribution of activities by category. Activities in epidemiology and infection control comprised 50% of requests. Issues related to the control of methicillin-resistant *Staphylococcus aureus* (MRSA), the prevention of transmission of tuberculosis to HCWs, and outbreak investigations were major activities in these two areas. Among the investigated outbreaks were cases of meningitis as a result of transmission of *Acinetobacter baumannii*, *Escherichia coli* bacteremia in neonates, and transmission of *Stenotrophomonas maltophilia* between patients.

Consultations with physicians regarding application of hospital epidemiology guidelines were responsible for 7% of infection control activities. Additional activities included organization of surveillance of nosocomial infections (3.1% of activities) and drafting and revising new or updated guidelines (6.8%). Many workshops on various nursing stations also were listed in this category. Most of these workshops or discussions were conducted jointly with one of the ICPs.

Tasks in the field of quality assurance or continuous quality improvement (CQI) represented 24.8% of all activities. Surveillance and control of antibiotic use also were classified in the category of CQI efforts and accounted for 2.5% of activities. This category also included projects to reduce the risk of HCWs to acquire or transmit nosocomial infections such as human immunodeficiency virus, hepatitis B or

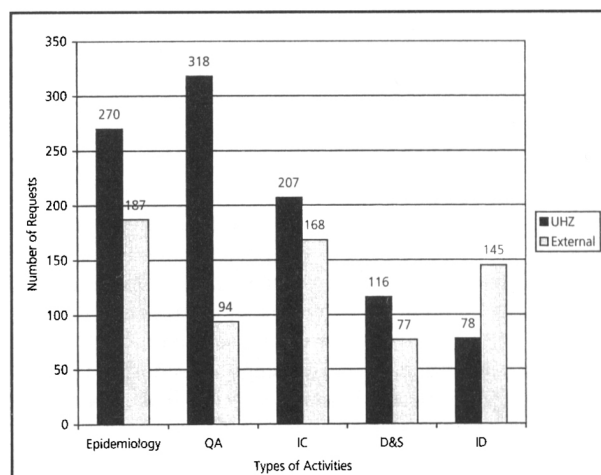


FIGURE. Distribution of activities of the hospital epidemiologist during the study period (1995-1997) in five major categories: epidemiology, quality assessment (QA), infection control (IC), disinfection and sterilization (D&S), and clinical infectious diseases (ID). Abbreviation: UHZ, University Hospital of Zurich.

C, and influenza (5.4% of activities). Questions and activities dealing with disinfection and sterilization accounted for 11.6% of all activities, and clinical consultations in IDs accounted for the remaining 13.4% of activities.

The majority (59.5%) of consultations originated from HCWs within the UHZ. However, 31.5% of consultations were requested by customers working in other hospitals, nursing homes, or doctor's offices within the boundaries of the State of Zurich. The remaining 9% of hospital epidemiology consultations came from out of state. Most states in the German-speaking part of Switzerland were represented in the list of consults. A small number of requests for advice came from other European countries.

The relative distributions of internal and external consults are shown in the Figure. The proportions of consults falling into the categories of epidemiology, infection control, and disinfection and sterilization were similar between the two sources. In contrast, consultations for issues of quality assurance and technology assessment were less frequently requested from outside of UHZ (14% of outside consults vs 32.1% at UHZ).

The distribution of activities was not stable throughout the study period. The number of questions related to the management of patients with MRSA fluctuated from 61 (14.6% of UHZ consultations) in 1995 to 73 (13.0%) in 1996 to 55 (8%) in 1997. In 1995, we recorded 19 patients (0.06 patients/100 admissions) colonized or infected with MRSA at our institution, 18 (0.05/100 admissions) in 1996, and 22 (0.06/100 admissions) in 1997. We noted a marked increase followed by a decrease in consultations related to prevention of tuberculosis transmission in the hospital, from 4% of all consultations in 1995 to 7.2% in 1996 to 1.3% in 1997. The number of HCWs with tuberculosis exposure was 99 in 1995, 150 in 1996, and 25 in 1997. This fluctuation contrasted with the relatively stable number of patients treated for tuberculosis in the outpatient and inpatient settings at UHZ during the same period: 32 in 1995, 31 in 1996, and 37 in 1997.

DISCUSSION

This study describes the distribution of activities of a hospital epidemiologist at a European tertiary-care medical center over the course of 3 years. Less than one third of consultations were directly related to issues of epidemiology. Involvement in many aspects of CQI and assessment of various new technologies were important tasks. The involvement of HEs in all aspects relevant to the prevention of nosocomial infections and the growing need to position hospital infection control as a quality-improvement activity that focuses on improving the care of patients and protecting the health of staff² has been considered essential by a Society for Healthcare Epidemiology of America (SHEA) consensus panel report.³ However, published data on the work load and type of work of HEs are rare.

A MEDLINE (National Library of Medicine, Bethesda, MD) search for publications providing data on this topic contributed mainly some descriptive comments.^{4,6} A few studies addressed related issues regarding ID specialists. Manian and McKinsey described their experience with curbside consultations in two separate hospitals.⁷ While their article did not focus on the number and type of formal consultations, it is interesting that 7% of curbside consultations concerned infection control issues and an additional 5% fell into the category of occupational health. The majority (61%) of curbside consultations were requested by telephone.

The data presented here give, for the first time, a relatively detailed picture of the distribution of requests that required action on the part of the HE. However, this study has several limitations. First, only activities prompted by questions addressed to the HE were recorded, thereby excluding activities initiated by the HE. The study also did not include requests answered by the ICPs. Second, the time spent in each area was not taken into account. As an example, questions regarding the management of a patient with MRSA colonization of a surgical site typically might have been answered in a brief telephone conversation, whereas a question on the proper disinfection of endoscopes initiated a CQI project that took several months to complete and involved many hours of planning, discussions, and supervision of laboratory tests. Third, these data reflect the distribution of consultations requested from an HE in a single tertiary-care hospital in Switzerland. This distribution may vary over time. Consultations may be distributed differently in other hospitals in different locations. Smaller, nonteaching community hospitals, for example, will not be concerned with infection control issues related to bone marrow transplantation. Methicillin-resistant *Staphylococcus aureus* also is encountered less frequently in smaller hospitals.⁸

Considering these limitations, what is the significance of this study? In this era of budgetary constraints, hospital administrators are less likely to pay for staff positions that do not generate revenue. This experience was recently illustrated by Deery.⁴ A SHEA membership survey revealed that 50.4% of respondents were not receiving financial compensation for time spent in infection control.⁹

As Deery points out, HEs need to convince hospital

administrators of the value of their services.⁴ In addition to the argument that infection control activities are cost-effective because they result in a reduction of the nosocomial infection rate,¹⁰ the documentation in this paper of the wide range of topics for which advice was sought by HCWs may help hospital administrators and other decision makers to understand better what HEs do.

Demonstrating that HEs provide services to many, if not most, departments and units within a given hospital further strengthens the argument that maintaining the job of the HE is crucial for the proper function of many processes within the hospital.³ In addition, as is suggested by Deery,⁴ clearly defined projects that result in measurable cost savings to the hospital will likely enhance the negotiating position of the HE in discussions with hospital administrators regarding salary and other aspects of support for the infection control program.

This study also shows that training in hospital epidemiology will need to include a wide spectrum of topics, ranging from disinfection through infection control to CQI. As ID specialists in clinical practice will invariably get involved in hospital epidemiology,^{11,12} such training should be included in the curriculum of fellowships in IDs.

The following conclusions can be drawn from this study: Hospital epidemiology encompasses a very broad field of activities. Issues related to technology assessment, quality control, and CQI form an integral part. Depending on the setting, the HE also may be active in clinical IDs and may be available to nonaffiliated institutions for advice in a wide range of categories. Further improvements of the methods to document the efforts and impact of HEs is warranted.

REFERENCES

1. Widmer AF, Sax H, Pittet D. Infection control and hospital epidemiology outside the United States. *Infect Control Hosp Epidemiol* 1999;20:17-21.
2. Wenzel R, Carlson B. Hospital epidemiology: beyond infection control and toward quality assurance. *Clinical Microbiology News* 1988;10:7-9.
3. Scheckler WE, Brimhall D, Buck AS, Farr BM, Friedman C, Garibaldi RA, et al. Requirements for infrastructure and essential activities of infection control and epidemiology in hospitals: a consensus panel report. *Infect Control Hosp Epidemiol* 1998;19:114-124.
4. Deery HG II. Negotiating with administration—or how to get paid for doing hospital epidemiology. *Infect Control Hosp Epidemiol* 1997;18:209-214.
5. Wenzel RP, Pfaller MA. Infection control: the premier quality assessment program in United States hospitals. *Am J Med* 1991;91(suppl 3B):27S-31S.
6. Simmons BP, Parry MF, Williams M, Weinstein RA. The new era of hospital epidemiology: what you need to succeed. *Clin Infect Dis* 1996;22:550-553.
7. Manian FA, McKinsey DS. A prospective study of 2092 "curbside" questions asked of two infectious disease consultants in private practice in the midwest. *Clin Infect Dis* 1996;22:303-307.
8. Panlilio AL, Culver DH, Gaynes RP, Banerjee S, Henderson TS, Tolson JS, et al. Methicillin-resistant *Staphylococcus aureus* in US hospitals, 1975-1991. *Infect Control Hosp Epidemiol* 1992;13:582-586.
9. Society for Healthcare Epidemiology of America. Membership Survey. *SHEA Newsletter* 1996;6:5.
10. Haley RW, Culver DH, White JW. The efficacy of infection surveillance and control programs in preventing nosocomial infections in US hospitals. *Am J Epidemiol* 1985;121:182-205.
11. Tice AD, Slama TG, Berman S, Braun P, Burke JP, Cherney A, et al. Managed care and the infectious diseases specialist. *Clin Infect Dis* 1996;23:341-368.
12. Hamory BH, Hicks LL, the Manpower and Training Committee, Infectious Diseases Society of America. Infectious disease manpower in the United States—1986, part 2: changes in practice patterns over time and training needs. *J Infect Dis* 1992;165:218-223.